AYURVEDIC MEDICINE

First Edition

2022

978-93-5679-906-6

Heal in India

The logo consists of three elements: a person doing yoga, a book and leafs; potraying health and holistic wellness flourishing and sharing the knowledge of Indian ancient teachings and modern learnings of the world.

Preface

India has emerged as one of the popular destination for the most demanded healthcare services worldwide which includes oncology, orthopaedic, neurology, cardiology, ophthalmology, elective surgery, fertility treatment, AYUSH etc. Presence of qualified healthcare professionals is making India a world class healthcare destination at affordable cost. There are state of the art Hospitals in India which are recognised for providing quality treatment internationally.

Every individual as a niche in his life, to achieve this he needs complete health, wellness and peace of mind. The health of Individual makes family, community, nation, continent and universe. Health is going behind the earth, in coming days we may need Hospitals in Mars and International Space Station(ISS), colonization of Mars is a competitive aspect of developed nations.

To make Indian Medical Graduate in line with International Medical Graduate, the National Medical Commission as made many amendments in Medical education. Competence Based Medical Education aims for early exposure to Clinical Skills. THE NATIONAL MEDICAL COMMISSION ACT, 2019 emphasis interaction with AYUSH according to section 50- Joint sittings of Commission, Central Councils of Homoeopathy and Indian medicine to enhance interface between their respective systems of medicine.

To achieve this goal NMC as made AYUSH posting in compulsory rotatory Internship. This books aims to give an insight for Ayurvedic Medicine as elective subject among AYUSH for modern Medical fraternity to understand the basics of Ayurveda and its application in day to day life in wellness and in treatment of ailments .

Hope this small step may bring good understanding and increase the economy of Country by boosting Medical Value Tourism. The brotherhood and mutual understanding makes both system handy to make National Integrative Health Policy dliver best practices in Medical education . research, Clinical practise and Ethics.

978-93-5679-906-6


Azadi Ka Amrit Mahotsav

Contents

1

INTRODUCTION

Chapter 1

Introduction

Ayurvedic Medicine

Ayurveda as Lifestyle

Ayurveda a short overview

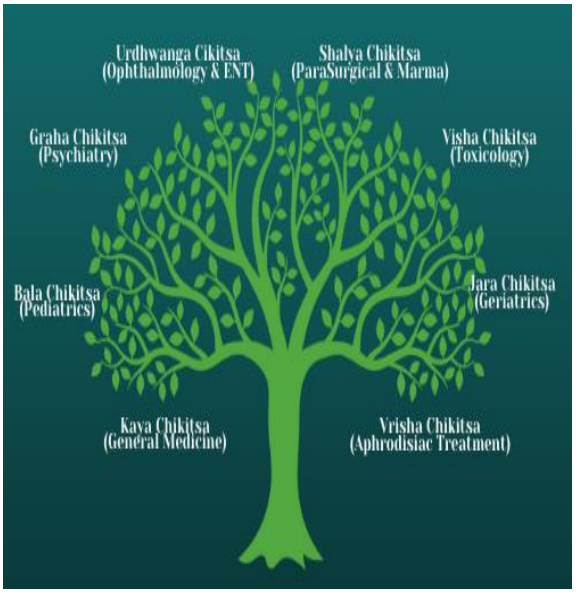
Origin of Ayurveda

The word 'Ayurveda' comes from the Sanskrit word 'Ayur' meaning 'Life' and 'Veda' meaning 'Knowledge'. Ayurveda means 'the science of life'.

Ayurveda has originated from the Vedas and is the Upaveda of the Atharva Veda.

Brahma, God of creation recollected Ayurveda and transmitted this knowledge to his son, Daksha Prajapati. Daksha Prajapati then taught this knowledge to the Ashwins (Ashwini Kumaras), two vedic twin Gods who were the celestial physicians. They then presented the knowledge of Ayurveda to Indra, the King of Gods. Indra had three disciples, namely Acharya Bharadwaj, Acharya Kashyapa and Acharya Divodas Dhanwantari. Acharya Bharadwaj's disciple was Atreya. The knowledge of Ayurveda was then passed from Atreya to his six disciples, Agnivesha, Bhela, Jatukarna, Parashara, Harita and Ksharpani and they separately created their own treaties in the field of Ayurveda. Among them, Agnivesha developed the fundamental Ayurvedic text of internal medicine called Agnivesha Tantra. Acharya Agnivesha's disciple, Acharya Charaka then revised Agnivesha Tantra and later known as Charaka Samhita and is considered as the earliest codified text in Ayurveda. Sushruta tradition was said to be descended and propagated by Dhanwantari. Sushruta School is dominated by surgical procedures and the codified document is known as Susruta Samhita. Thus started the tradition of passing down the knowledge of Ayurveda from Gods to Sages.

The Mahabharata, India's epic narrative, also tells of the incarnation of Vishnu as Dhanwantari, King of Kasi. During the great cosmic churning of the ocean for the celestial nectar of immortality, Dhanwantari emerged, and Vishnu commissioned him to help humanity cure diseases.



Eight Divisions

Ayurveda has eight major disciplines that are collectively known as Ashtanga Ayurveda, or the Eight Branches of Ayurveda:

1. Kaya Chikitsa (General Medicine)
2. Bala Chikitsa (Pediatrics)
3. Graha Chikitsa (Psychiatry)
4. Urdhwanga Chikitsa (Ophthalmology & ENT)
5. Shalya Chikitsa (ParaSurgical & Marma)
6. Visha Chikitsa (Toxicology)
7. Jara Chikitsa (Geriatrics)
8. Vrisha Chikitsa (Aphrodisiac Treatment)

Definition of health and Disease

Health (Swasthya):

"sama dosha sama agnischa sama dhatu mala kriyaaha prasanna atma indriya manaha swastha iti abhidheeyate"

It is the balanced state of functions of Tridosha (Vata, Pitta, Kapha), Saptadhatu (Rasa, Rakta, Mamsa, Medo, Asthi, Majja, Sukra), Agni (Digestive fire) and Mala (Urine, Faeces and Sweat) with delighted Mind, Senses & Spirit.

Disease:

"vikaro dhatu vaishamyam"

The imbalance of the Dhatus is called Vikara or Vyadhi (diseased state).

In this context, The Doshas (Vata, Pitta and Kapha), Dhatus (Rasa, Rakta, Mamsa, Medas, Asthi, Majja and Shukra), the gunas of the mind (Satva, Rajas and Tamas) are together called the Dhatus.

Dosas overview

The word Dosha is derived from Sanskrit root word *Dusha* which means contamination. Vata, Pitta and Kapha are the three doshas which are the governing principles of physiology and psychology.

Vata Dosha:

Vata is derived from the verb root *'Va'* meaning to move or transport or impel.

Enthusiasm, respiration, movement, transportation of nutrients, proper elimination of urine, feaces, sweat, menstrual blood and fetus are the normal functions of vata.

Pain, stiffness, heaviness in the body, loss of sleep, roughness of skin, emaciation, instability of mind, irregularity of digestion, muscle wasting, tremors, blackish discoloration, weakness of sensory and motor functions, loss of consciousness, giddiness, constipation are the symptoms of impairment of functions of vata.

Vata gets aggravated by intake of bitter, astringent, dry and pungent foods, fasting, suppression of natural urges, excessive cold, worry and night awakening.

Prana, Udana, Vyana, Samana and ***Apana*** are the five types of vata and they regulate the specified functions in the body.

Prana regulates the respiration, will power, functions of heart, sense organs, intellect and performing functions such as expectoration, sneezing, belching and swallowing of food.

Udana functions are initiation of speech, enthusiasm, effort, energy, strength, color, complexion, memory.

Vyana regulates the muscle functions such as flexion, extension, opening and closing of eyelids

Samana, which receives the food into the GI tract, helps in digestion of food, separation of essential part and waste part, and excrete the waste in their respective path.

Apana evicts the semen, menstrual blood, feaces, urine and the products of conception.

Pitta Dosha :

Pitta is derived from the verb root ‘tapa’ meaning to heat.

Pitta is involved with various physiological functions related to agni (heat) like digestion, metabolic and enzymatic activities such as digestion of food, body heat, thirst, hunger, vision, lustre, cheerfulness, intellect, strength, retention of memory, softness of body and also regulate the hormones.

Yellowish discoloration of urine, faeces, eyes, skin, burning sensation, reduced sleep, excessive perspiration, weakness of digestion, loss of lustre, feeling of cold and burning sensation are the symptoms of impairment of pitta function.

Pitta gets aggravated by intake of pungent, sour, hot, salt and irritant substances, anger, excessive fasting, exposure to hot sun.

Pachaka, Ranjaka, Sadhaka, Alochaka and ***Bhrajaka*** are the five types of pitta, they regulate the specific functions in the body.

Pachaka pitta digests the ingested food and separates the essence and waste, it grace and influence the other types of pitta

Ranjaka imparts colour to the ahara rasa (the end portion of digestion which gets absorbed and circulates in the body) and converts into blood.

Sadhaka helps to achieve the goal through intellect, discriminating power and self esteem.

Alochaka which is responsible for sight and thinking processes.

Bhrajaka which gives natural lustre to skin.

Kapha Dosha:

Kapha represents the water element of the human body and translates as mucus or phlegm.

Body and mind stability, strength, enthusiasm, moistness, oiliness, smoothness, lubricates and connects joints and bones, promotes wound healing, increases libido, good sleep, memory are the normal functions of kapha in the body.

Diminution of digestive fire, excess salivation, nausea, cold, excessive sleep, lack of enthusiasm, pallor, cough, giddiness, palpitation, laxity of joints, abnormal growth, depression are the symptoms of imparied functions of kapha dosha.

Kapha gets aggravated by intake of excess sweet, sour, salty, unctuous, heavy substances, lack of exercise and day sleep.

Avalambaka, Kledaka, Tarpaka, Bodhaka and ***Sleshaka*** are the five types of kapha, they regulate the specific functions in the body.

Avalambaka supports and protects the vitality of heart and lungs with the help of food essence.

Kledaka moistens and produces the unctuous food which enters the stomach.

Tarpaka gives nourishment and promotes the proper functioning of sensory organs.

Bodhaka helps to perceive the taste by tongue.

Sleshaka lubricates the joints and protects from bone friction and helps for easy movement of joints.

Dhatus and Malas

Dhatus:

"dhaaranaath dhaatavah"

That which does Dhaarana (holds the body) is called Dhatus. The body is composed of seven Dhatus which is responsible for the entire structure of the body.

Rasa:

Rasa is the first Dhatu formed from the essence of the food produced after digestion, which circulates all over the body. The function of rasa dhatu is Preenana (nourishment of the body).

The digested food is converted to essence and waste and the essence part is called Rasa Dhatu.

Rakta:

Rakta is the blood and it is formed from Rasa Dhatu. The function of Rakta is Jeevana (enlivening). Its prime function is sustenance and nourishment of the body. It brings luster to the skin and nourishes the Mamsa Dhatu.

Mamsa:

Mamsa is muscle tissue. It is formed from and receives nourishment from the Rakta Dhatu. Its function is Lepana (binding).

Mamsa gives covering and strength to the body's frame. They aid in various functions of the body like movement of joints and locomotion. Also it provides nourishment to the forthcoming Dhatu.

Medas:

Medo Dhatu is compared to Fat tissue. It is produced from and nourished by the Mamsa Dhatu. Its main function is Snehana (Lubrication).

It lubricates every cell of the body and controls sweat formation. Proper nourishment of Meda Dhatu gives proper shape to the body. It acts as a shock absorber and also protects the body from excess cold and hot climate.

Asthi:

Asthi Dhatu is bone tissue. It is formed from the Medo Dhatu. Its main function is Dharana (to hold the body straight). It forms the framework to give shape and structure of the body.

Majja:

Majja Dhatu is compared to bone marrow. Its main function is Poorana (Filling). It fills in the bone cavities and are formed from and nourished by the Asthi Dhatu.

During the formation of Asthi Dhatu, Vata creates spaces in Asthi. These spaces are filled with nourishing tissues known as Majja or Bone marrow.

Shukra:

Shukra is the seventh and final Dhatu in the body and is considered as the essence of all the other Dhatus. It is formed from the Majja Dhatu and is located in the entire body. Shukra is white, pure, excellent Dhatu, which is considered as best among all seven Dhatus.

Malas:

Malas are the waste products of metabolism. They are Pureesha (faeces), Mutra (urine), Sweda (sweat).

Mala are the waste substances that need to be eliminated from the body. They are formed as a result of various physiological activities occuring in the body. After digestion the end product is divided into Saara form (Ahara rasa) and Kitta bhaaga (Mala). The name Mala is derived from the word “Malineekaranam" which means contamination. The Malas are also known as Dushya because they may cause diseases under the influence of the imbalanced doshas.

Pureesha:

Pureesha is the waste product which is left after digestion, after the nutrients from food have been absorbed by the body. The quantity of excreta is determined by the attributes of food ingested and also by the process of digestion taking place in the Maha Srotas.

Avasthambha is the primary function of Purisha. Avashtambha means Shariradharana (gives strength to the body). Purisha also performs Vayu and Agni Dharana i.e. Purisha gives strength to Vayu and Agni.

After performing its Sharira Dharana function, Purisha gets excreted out of body under the influence of Apana Vata.

Mutra:

According to Ayurveda, mutram (urine) is also the waste by-product of pachana (digestion of food) and it is said to be formed of excess moisture content in the body resulting from digestion. It performs the major function of balancing the moisture content or water balance in the body. The Mutra excretes all the bodily wastes formed as a result of various metabolic processes in the body.

Poor urine output results in bladder pain or infection, difficult urination, fever, thirst, dry mouth, or dehydration.

Sweda:

It is not the waste byproduct of food digestion but a waste product formed during Dhatu level pachana (metabolism at the Dhatu level). It is the waste product of Medo Dhatu.

Sweat controls the body temperature by expelling excess water and toxins, moistens the skin and hair, cools the body, carries excess fat from the body, and purifies the blood.

Excess sweating can cause increased perspiration, Bad odour, Itching on the skin, dehydration, fatigue, or convulsions. Deficient sweating can result in stiff hair, dry skin, skin fissures, wrinkles.

Rasa(Tastes)

Tastes (Rasa)

Rasa is defined as knowledge perceived through Rasana Indriya (sense of taste) when substances come in contact with the tongue.

Madhura (Sweet), Amla (Sour), Lavana (Salt), Katu (Spicy/ Pungent), Tikta (Bitter) and Kashaya (Astringent) are the six types of Rasa.

Madhura Rasa (Sweet taste):

Madhura rasa increases the kapha dosha in the body. It helps to balance the vata and pitta dosha.

It nourishes the dhatus, promotes breast milk, hair growth, healing, improving the complexion, voice, and increasing the life span are the functions of madhura rasa.

Excess use of madhura rasa causes obesity, loss of digestion, loss of appetite, diabetes, tumors, and goitre.

Amla Rasa (Sour taste):

Amla rasa pacifies the vata and increases pitta and kapha.

It clears the oral cavity, causing horripilation, tingling sensation of teeth, and contraction of eyes and eyebrows.

Function of amla rasa is to increase the appetite, increase taste, produce saliva, helps for digestion, is pleasant, energizes the body and enlightens the mind.

Excess consumption of amla rasa causes thirst, diminished vision, giddiness, itching, anemia, edema, fever, causing burning sensation in the throat and chest.

Lavana Rasa (Salty taste):

Lavana rasa decreases vata and increases the pitta and kapha.

It causes watering of the mouth, burning sensation of cheeks and throat.

Lavana rasa increases taste, digestion, helps in carmination, cures stiffness, obstruction and accumulation, causes unctuousness and perspiration.

Excess consumption of lavana rasa causes baldness, greying of hair, skin wrinkles, thirst, skin diseases, toxicity, cellulitis, body weakness.

Katu Rasa (Pungent/ Spicy taste):

Katu rasa decreases the kapha and increases the pitta and vata.

It produces trembling at the tip of the tongue, watering of eyes, nose, mouth and causes burning sensation of cheeks.

It is carminative, stimulates digestion, improves appetite, helps in absorption of food, disintegrates obstruction, it reduces the unctuousness, mucous, and lipids.

Excess usage causes thirst, loss of strength, fainting, muscle cramps, loss of libido, hip and back pain, tremor.

Tikta Rasa (Bitter taste):

Tikta rasa decreases the pitta & kapha and increases the vata.

It cleans the mouth and inhibits the sensation of taste. Tikta rasa is not a pleasant taste but it promotes taste, improves appetite, cures worms, thirst, burning sensation, fainting, fever, skin ailments, over secretion of mucus, promotes intellect, purifies breast milk, clears the throat.

Excess usage of tikta rasa causes depletion of dhatus.

Kashaya Rasa (Astringent taste):

Kashaya rasa pacifies the pitta & kapha and increases vata.

It makes the tongue dry and produces stiffness in the throat.

It causes dryness, relieves sputum, delays the Ama formation, and great skin tonic.

Excessive use of kashaya rasa causes abdominal stress, abdominal distension, chest pain, thirst, lack of sexual power, obstruction of channels and constipation.

More and more research studies are revealing unexpectedly important roles of taste for health and pathogenesis of various diseases. Only recently it has been shown that taste receptors have many extraoral locations (e.g., stomach, intestines, liver, pancreas, respiratory system, heart, brain, kidney, urinary bladder, pancreas, adipose tissue, testis, and ovary), being part of a large *diffuse chemosensory system*. The functional implications of these taste receptors widely dispersed in various organs or tissues shed a new light on several concepts used in ayurvedic pharmacology (*dravyaguna vijnana*), such as taste (*rasa*), postdigestive effect (*vipaka*), qualities (*guna*), and energetic nature (*virya*). This review summarizes the significance of extraoral taste receptors and transient receptor potential (TRP) channels for ayurvedic pharmacology, as well as the biological activities of various types of phytochemical tastants from an ayurvedic perspective. The relative importance of taste (*rasa*), postdigestive effect (*vipaka*), and energetic nature (*virya*) as ethnopharmacological descriptors within Ayurveda boundaries will also be discussed.

1. Introduction

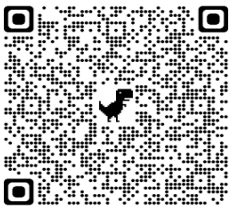
Until recently, the essential role of taste was considered to be the detection of nutritious and poisonous substances. Accumulating evidence indicates that taste receptors mediate diverse important nontasting roles through various specialized mechanisms. This perspective is closer to Ayurveda vision on taste (Sanskrit *rasa*).

Concerning the number of taste modalities, modern science recognized five (sweet, bitter, salty, sour, and umami), while Ayurveda six (*madhura*: sweet, *lavana*: salty, *amla*: sour, *katu*: pungent, *tikta*: bitter, and *kashaya*: astringent).

The sense of taste is governed by distinct cell types located in the taste buds that express only one type of specific taste receptor (TR). There are four categories of taste bud cells: type I, type II, type III, and type IV. Type II cells (or receptor cells) are involved in bitter, sweet, and umami detection, while type III (or presynaptic cells) in sour taste perception .It is not yet clear whether type I (glial-like supporting cells similar to astrocytes) or type III cells (presynaptic cells) play the main role in salty taste perception. Type IV cells are basal cell type, responsible for renewal of taste bud cells and mechanoreception .

Sweet, bitter, umami tastes, and probably astringency trigeminal orosensation also, are mediated via G protein-coupled receptors, while salty and sour tastes, as well as pungency trigeminal orosensation, involve different systems, which include specialized membrane ion channels.

Interestingly, since their discovery in the tongue, the taste receptors, along with several taste signal transduction molecules, have been demonstrated to be expressed in many extraoral locations (e.g., stomach, intestines, liver, pancreas, respiratory system, heart, brain, kidney, urinary bladder, adipose tissue, testis, spermatozoa, lymphocytes, and endocrine glands). Taking into account the wide tissue distribution of taste receptors, a surprisingly strange conclusion arises: the whole body is endowed with taste receptors. At the origin taste receptors were chemoreceptors. Wherever in a biological organism the perception of certain chemicals is necessary, the existence of such receptors is mandatory. What at first glance seemed astonishing (taste receptors everywhere), at further scrutiny appeared as self-evident and necessary (chemoreceptors anywhere they are needed).



This review is intended to summarize and discuss the significance of extraoral taste receptors and other chemosensory processors for ayurvedic pharmacology.

2. Taste Reception and Moreover

Sweet taste receptors are heterodimers of the G protein-coupled receptors (GPCR), T1R2, and T1R3 . A wide range of natural or artificial sweet tastants, from simple six-carbon saccharides to guanidinoacetic acids, large peptides, and polypeptides, bind to this single T1R2/T1R3 dimeric receptor . T1R3 subunit has been also shown to form homodimers (T1R3/T1R3) that bind monosaccharides and disaccharides well as heterodimers (T1R1/T1R3) that bind L-amino acids, mediating the so called "umami" taste. Bitter tasting compounds are detected by receptors belonging to the T2R family of receptor proteins. There are only approximately 25 different T2Rs , which detect more than 800 bitter tasting compounds . This is possible because certain T2Rs have a low selectivity (they are more promiscuous, having a broad receptor repertoire or breadth of tuning) . Sweet, umami and bitter taste receptors share a common transduction mechanism based on activation of the heterotrimeric G protein, whose β/γ subunit further conveys the signal for membrane depolarization and generation of an action potential .

Ayurveda classifies meat taste as sweet, although modern science classifies it as umami (the Japanese word "umai" means "meaty"); therefore within ayurvedic framework umami should be considered as a peculiar sweet submodality . Interestingly, several scientific findings support the ayurvedic perspective: (1) there are important structural similarities between sweet (T1R2/T1R3) and umami (T1R1/T1R3) taste receptors, both heterodimers, having one subunit in common ; (2) mice perceive synergistic umami mixtures (glutamate and ribonucleotide) as tasting sweet; (3) taste cells coexpress the sweet taste and umami taste receptor subunits (all three T1R subunits) .

Ayurveda classifies also fats (e.g., clarified butter or ghee, marrow fat, and the majority of oils) as having sweet taste ; therefore within ayurvedic framework the newly proposed "fatty taste" should be considered as another peculiar sweet submodality. Several studies showed that tastants eliciting fat taste, like free fatty acids (FFA), may be detected by specific GPCR (e.g., GPCR120) and a rather unusual gustatory detector, CD36 (i.e., cluster of differentiation 36), a multifunctional versatile ancestral protein, widely distributed in the body (microvascular endothelium, macrophages, dendritic cells, microglia, retina, erythroid precursors, platelets, liver, adipose tissue, heart, skeletal muscles, breast, kidney, and gut)]. These two lipid sensors are coexpressed, probably in type II taste bud cells, and cooperate in fat detection. CD36 displays a greater binding affinity for long chain fatty acids (LCFA) than GPCR120, having the primary role in fat detection, and its expression is downregulated during a meal, in contrast with GPCR120 expression, which is not changed during the meal . The signaling cascade induced by LCFA in taste bud cells showed several similarities with the signal transduction cascade specific for sweet, bitter, and umami taste: GPCR involvement, activation of phospholipase C, calcium signaling, and transient cell depolarization are caused by the opening of the Na^+-permeable channel called transient receptor potential melastatin-5 (TRPM5).

“Fatty taste” perception via CD36-GCCRs pathway is not the single perception modality. It seems that dual, complementary mechanisms are involved in the detection of dietary fats: (1) a high-sensitivity specifically tuned mechanism (CD36-GCCRs pathway), located in the gustatory epithelium, is involved in the detection of low concentrations of LCFA present in food items or released from triglycerides by a lingual lipase, (2) a low sensitivity, broadly tuned mechanism, represented by the trigeminal pathway, is located in the nongustatory epithelium, involved in the detection of high concentrations of various types of FFA .

Astringency is not recognized as a distinct taste, its perception being possible with nontaste oral tissues, and increased with repetitive sampling (a characteristic typical for trigeminal sensation, not for taste sensation) .The most widely accepted definition is that astringency is a long lasting sensorial experience of drying, puckering, or roughness on the tongue and oral cavity, produced by certain food and beverages, most of them rich in tannins, like unripe fruits, nut skin, cocoa, green tea, grape seeds, and red wine . Other compounds able to produce astringent sensation are metal salts (e.g., aluminum ammonium sulfate, aluminum potassium sulfate), acids (e.g., tartaric acid), and dehydrating agents . Scientists explained most often astringency as a trigeminal orosensation: astringent compounds are detected by trigeminal sensors and activate a G protein-coupled signaling pathway that involves recruitment of adenylate cyclase, followed by the activation of cyclic nucleotide-gated channels, and does not involve transient receptor potential (TRP) channels .The astringent signal amplification takes place by Cl^- efflux through Ca^{2+}-activated Cl^- channels in the trigeminal neurons. A possible synergism between a chemosensory and mechanosensory activation of trigeminal sensors was suggested, but this is still under debate and requires validation]. The precipitation of salivary proteins by food tannins, especially proline-rich proteins, followed by stimulation of oral mechanosensors , as contributing mechanism to the astringency perception, is more or less accepted by the scientists today.

Salty and sour are recognized as “mineral taste,” both being evoked by elemental ions (salty taste by Na^+ concentrations from 10 mM to 500 mM, while sour taste by acidic pH and also weak organic acids, able to permeate the membrane) .

Regarding salty taste, the precise transduction mechanisms responsible for this taste and their location remain still unclear . It is not clarified yet whether type I or type III cells are the principal actors in salty taste detection .

Appetitive responses to NaCl (<100 mM NaCl, called “low salt”) have been linked most likely to amiloride-sensitive epithelial sodium channels (ENaC), while aversive responses to high-salt (>300 mM, referred as “high-salt”) have been correlated with the recruitment of the two primary aversive taste pathways by activating the sour- and bitter-taste-sensing cells and are considered to be amiloride-insensitive .

ENaC are expressed on type I taste cells of taste buds. The classical taste “receptor,” in case of appetitive salty taste, is actually a specific transport pathway that allows selectively the Na^+ and Li^+ cations (and not other monovalent cations) to enter the taste bud cell and afterwards to spread depolarizing current. ENaC was first proposed to play a role in salty taste over 30 years ago. Scientists know today that ENaCs located in the apical membrane are essential for salty taste perception, but also basolateral channels may contribute [2]. Four homologous epithelial Na channel (ENaC) subunits (α, β, γ, and δ) have been identified in mammals. All four ENaC subunits were identified in human taste bud cells as well as in nonchemosensory lingual tissue . The main ENaC is a heterotrimeric assembly of α, β, and γ subunits, characterized primarily by its high affinity for amiloride, a potassium-sparing diuretic which acts precisely by blocking ENaC. The tissue distribution pattern of ENaC isoforms is different, δ subunit being expressed mainly in nonepithelial cells, in the brain (cerebellum, cerebral cortex, hippocampus, caudate nucleus, and putamen), pancreas, liver, testis, and ovary, whereas β and γ subunits mainly in the epithelial cells, in the kidney, lung, and colon. It is not yet clear whether ENaCδ is functional in vivo in association with other subunits or active as monomer .

High-salt response is nonselective (the detector recognizes a wide range of salts, e.g., Na^+, K^+, NH_4^+, Ca^{2+}, etc.) and it was proposed to be TRPM5/PLCβ2 dependent in bitter-, as well as in sour-sensing cells .

Regarding the sour taste, the molecular identity of sour receptor is still unknown. Although several candidates for sour receptors or transducers have been proposed, including acid-sensing ion channels (ASICs), hyperpolarization-activated cyclic nucleotide-gated (HCN) channels, and transient receptor potential (TRP) channels (polycystic kidney disease protein-like, PKD2L1, PKD1L3); there is no strong evidence of a direct link between these various channels and sour taste transduction.

Only recently, scientists have discovered that the proximate stimulus is intracellular acidification in type III cells, not extracellular protons per se . Two potential mechanisms mediate this acidification of cytoplasm: (1) a proton influx through a Zn^{2+}-sensitive proton conductance (in case of extracellular partly dissociated organic acids, strong inorganic acids) ; (2) permeation of protonated organic acids (e.g., acetic acid) into the type III cell cytosol, followed by their dissociation . The consequent drop in the intracellular pH blocks the resting K^+ current in sour taste cells by triggering the 2-pore-domain potassium channel (K_2P) , and this event ultimately leads to an action potential. This signaling pathway explained why weak acids (which can diffuse across the membrane) taste sourer than strong acids (which cannot diffuse across the lipid bilayer) .

Unexpectedly, this sensitivity to intracellular acidification is attributed to relatively ubiquitous ion channels, K_2P, whose distribution is not restricted to sour taste cells, being expressed in a wide variety of tissues and organs: brain, sperm, heart, kidney, liver, vascular smooth muscle cells, skeletal muscle, and so on. Considering that such a diversity of cell types might detect acid stimuli, scientists have already raised the question of potential physiological roles of acid-sensitive receptor cells outside of the taste system .

K_2P family contains several members, which play essential background roles in cells, such as control of cellular excitability, volume, and growth . The expression of various K_2P members in taste bud cells surrounding nontaste epithelium and extraoral locations varies among species .Some members are highly sensitive to intracellular acidification, while others more to extracellular acidification.

Pungency or spiciness is a trigeminal sensation, like astringency, not being recognized as a distinct taste in modern medicine, rather belonging to chemesthesis. Chemesthesis is a chemical sense, as well as taste, but refers to the more general sensitivity of the mucous or cutaneous surfaces, perceived as pungency, irritation, but also thermosensations (cooling or heat) . Ayurveda includes under the pungency *(katu rasa)* many sensations that belong to the chemesthesis, such as irritation induced by hot chili peppers (capsaicin), aromatic sensations induced by spices or plants rich in volatile oils (e.g., oregano, mint) . Certain members of the transient receptor potential (TRP) channels family are key players in the perception of pungency: TRP vanilloid types 1, 3, and 4 (TRPV1, TRPV3, and TRPV4) and TRP ankyrin type 1 (TRPA1) for "hot" pungency, while TRPM8 for "cold" pungency .

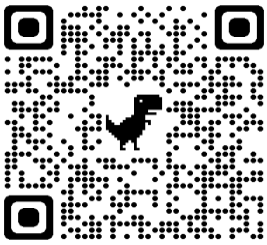
TRP channels are nonselective cation channels permeable to Ca^{2+}, Na^{+}, Mg^{2+} ions, and so on. The complexity of TRP functionality is far from clear; many studies consider the involvement of TRP also in other taste perception, such as salty, sweet, bitter, detection of temperature, or mechanoreception .

It is interesting to notice that the so called "cold" ayurvedic *rasa* (sweet, bitter, and astringent) are detected by receptors coupled with G proteins, while the "hot" *rasa* (salty, sour, pungent), which have a sensorial characteristic of sharpness in Ayurveda, are directly mediated through various types channels, which are penetrating through membrane.

3. Extraoral Distribution of Taste Receptors

More and more evidence shows that the localization of taste receptors is not restricted to oral cavity, not even to certain tissues/organs, but rather evenly distributed over the entire body. Even if not all extraoral sites express TRs at levels comparable to taste tissue, this wide distribution suggests that TRs may have functional roles far beyond the original concept of taste perception. It is highly suggestive that a very important study published by Yamamura et al. showed that ENaCδ isoform is expressed in all the human tissues tested (more than 50), although in very different proportions . Also TRPs, which are responsible for oral nongustative chemosensitivity, have a wide tissue distribution, like taste receptors. For instance, TRPV1 mRNA was detected in all the tested human tissues .

Scientists suggested that these extraoral taste cell-related elements that are mainly solitary or clustered cells, not grouped in buds, may be part of a large *diffuse chemosensory system* (DCS), compared with an iceberg, the taste buds representing only the most visible portion, while the extraoral taste cells are the larger "submerged" part . Scientific studies showed that DCS may have crucial physiological roles. DCS seem to be involved in detection of irritants, control of airway surface liquid secretion, innate immunity, microbial population, regulation of appetite, cell proliferation, relaxation/contraction of muscles, bronchia, urinary bladder, and vessels, and regulation of heart activity



The functional implications of these taste receptors and TRPs widely dispersed in various extragustatory tissues also shed a new light on several ayurvedic concepts used in ayurvedic pharmacology *(dravyaguna vijnana)*, such as taste *(rasa)*, postdigestive effect *(vipaka)*, qualities *(guna)*, and energetic nature *(virya)* of medicinal plants and food.

4. Ethnopharmacological Descriptors in Ayurveda

Ayurvedic pharmacological description of a medicinal plant uses a set of *ethnopharmacological descriptors* that are groups of herbal attributes: *rasa*: taste, *guna:* qualities, *vipaka*: postdigestive effect, *virya*: energetic nature/potency, *prabhava*: special/extraordinary potency.

All herbal descriptors are traditionally used to select the medicinal plants for the treatment of various diseases.

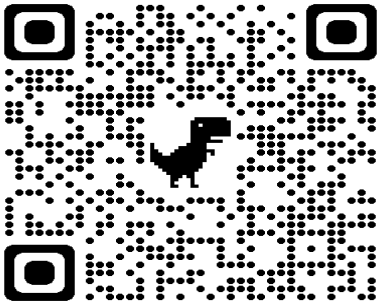
In Ayurveda tastes *(rasa)*, two by two, are complementary in terms of qualities *(guna)*; for instance salty taste (which is hot, heavy and wet) antagonizes bitter taste (which is cold, light and dry)

Further experimental studies are required in order to verify whether these *ethnopharmacological descriptors* may become predictor tools for specific pharmacological activities.

An interesting finding is that the gustatory neurons in the rostral nucleus of solitary tract respond not only to tastant compounds, but also to somatosensory inputs, such as tactile and temperature stimulation, as well , explaining the integrative perception of a food item quality, which is also described in Ayurveda by several correspondent ethnopharmacological descriptors (*guna*, e.g., smoothness tactile sensation, *virya*, hot or cold sensation).

5. Taste (*rasa*) Concept in Ayurveda

The ayurvedic physicians agree that the Sanskrit term *rasa* designates not only the taste or gustatory sensation perceived through the oral taste buds, but also the flavor experienced by retronasal olfaction [203]. Moreover, taking into account the modern definitions of astringency and pungency as trigeminal orosensations, we hypothesize that the ayurvedic term *rasa* has a much more complex meaning, designating, beyond taste and retronasal olfaction, also the trigeminal orosensations



Regarding the term *rasa,* in the present paper we shall use, as equivalent English term, the word "taste," for the purpose of simplicity, although this only approximates the versatility of *rasa.*

According to Ayurveda, *rasa* represents an attribute of the substance *(dravya)*, being experienced the moment a substance comes into contact with the tongue

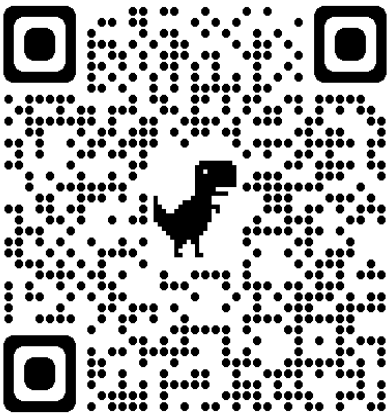
Taste of medicinal plants has been considered for millennia in Ayurveda, as the most important ethnopharmacological descriptor used for identification of drug properties. At the beginning of the chapter on the properties of the drugs, in Cakrapanidatta's commentary to Caraka Samhita (one of the three major ancient Ayurveda texts), it is underlined: "Among *rasa*, *virya* and *vipaka*, *rasa* is the most important one; hence the discussion in this chapter is initiated with the description of *rasa* (taste)." (Caraka samhita, Sutrasthana XXVI.1-2/Cakrapanidatta's Agnivesa Dipika) . Why is this? One of the reasons would be the fact that *rasa* can always be ascertained by direct perception (Sansk. *pratyaksha*),
while *virya* and *vipaka* not (observing the drug action on the body, after ingestion, while the drug is processed through digestion and metabolism, should sometimes be the basis for inferring hot/cold *virya* and should always be the ground for deducing *vipaka*) (Caraka Samhita, Sutrasthana XXVI.66/ Cakrapanidatta's Agnivesa Dipika) . Since direct perception of *rasa*, without any subsequent analysis, represents an unbiased observation (the main requirement of any scientific study), *rasa* is considered the most important tool of drug discovery in Ayurveda .

Another potential explanation lies in the relative causality link between different ethnopharmacological categories:

"The substance *(dravya)* is the origin/cause *(ashraya)* and taste *(rasa)* is the effect *(karya)*. (…) Similarly, the attributes *(guna)* and pharmacological actions *(karman)* are dependent upon the taste *(rasa)*, which is the origin/cause *(ashraya)*." (Caraka Samhita, Sutrasthana XXVI.66/Cakrapanidatta's Agnivesa Dipika) .

The importance of ancient science of *rasa* is suggested also by the following fragment: “Even the knowledge of the classification of *rasa alone* may help in the identification of etiology, symptomatology and treatment of diseases.” (Caraka Samhita, Sutrasthana XXVI.27/Cakrapanidatta's Agnivesa Dipika). In Ayurveda, apart from the humoral classifications of diseases based on three *dosas* (*Vata, Pitta, and Kapha* humors) or hot/cold qualities, there is an alternative classification into six main categories characterized by the excess of a certain *rasa*: excessive sweetness, saltiness, sourness, bitterness, pungency, and astringency . Within this framework of *rasa*, not only the etiology, but also the treatment is *rasa*-oriented.

We estimate that new dimensions of this ancient Ayurveda theory will be revealed in the light of extraoral taste receptor discovery, as their functions will be understood. Even if the extraoral receptors do not play a role in the taste (as this is understood and defined by the modern science), they may play functional roles in connection with *rasa*, which is a broader concept than the modern concept of taste, and which includes both gustative and extragustative roles .



Svastavrtta- Healthy living

Dinachary- Daily regimen

The word Dinacharya is derived from two words; ‘Dina’(day) and ‘Charya’(activity). The activities or regimens which need to be followed daily by an individual to maintain one's health is Dinacharya.

Dinacharya aims at providing a comprehensive body-mind health. It is one of the preventive health care practises in Ayurveda.

1. A healthy person should rise at Brahma Muhurta (3hrs preceding sunrise).
2. After self analysing on how well the body feels, evacuation of urine and feces should be done.
3. Brush the teeth with any twigs of herbs like neem, babul, etc, while brushing care should be taken not to injure the gums
4. Scrape the tongue and wash the face.
5. Application of collyrium of Sauviranjana should be done everyday. It lubricates the eyes, improves vision and promotes growth of eyelashes.
6. A collyrium of Rasanjana should be applied once a week to promote elimination of kapha accumulated in the eyes.
7. Then one should instill nasal drops (Nasya) with herbal decoctions or herbal oils.
8. Kavala or gargling should be done thereafter followed by inhalation of smoke (dhumapana) from herbs.
9. Abhyanga (oil massage) should be done daily in the morning. It delays ageing, increases strength, relieves tiredness, balances vata, improves skin tone and complexion. Application of oil is particularly important on the head, ears and feet.
10. One should undertake exercise limited to half their strength. It makes the body lighter, increases work capacity, improves digestion, reduces fat, and makes the organs of the body strong and stable.
11. Udwartana (herbal powder body massage) reduces kapha, dissolves adiposity, stabilises the organs and improves complexion.
12. Bathing with warm water enhances appetite and digestive power and promotes longevity, virility, strength and energy; reduces itching, removes dirt, tiredness, sweat, thirst and burning sensation. Warm water when used for bathing the head, it reduces the strength of eyes and affects hair growth.
13. Food: One should take food only after the previous meal has completely digested, in moderate quantity. It is important to take food in the proper quantity which promotes the digestive fire and helps in proper digestion.
14. Wearing of foot wear, holding of a stick or umbrella for self protection is recommended.

Sleep

Nidra (sleep) is one of the most important components of our physiology. It is considered as one of the three pillars of health, alongside Ahara (food) and Brahmacharya (celibacy). Hence, proper sleep is an essential element for maintaining health and longevity.

According to Charaka, when the Manas (mind) including the Indriyas (sense organs) is exhausted and they dissociate themselves from their objects, then the individual sleeps.

Sushruta Samhita says timely sleep leads to nourishment, increases complexion, strength, enthusiasm, good digestive fire and equilibrium of all the dhatus. The opposite is caused due to improper sleep.

One should not indulge in sleep in an inappropriate time, or too much or too little sleep. Being awake at night increases Vata and sleep during the day increases Kapha.

The disturbance in sleep might be related to the faulty lifestyle, mental tension, changed food habits and stress which ultimately disturbs the sleep. Ayurveda describes Nidranasha (sleeplessness) as a symptom, as a disorder and even sometimes as a complication of certain diseases. Particular symptoms arising due to loss of sleep are bodyache, heaviness of head, yawning, dullness, fatigue, giddiness, tiredness and diseases due to derangement of Vata. Hence, at night one should sleep at the right time and for the right duration.

Sleeping during the day time in the seasons other than summer is not advisable as it causes vitiation of Kapha and Pitta. Persons with excessive fat, those who regularly take dry foods, those with Kaphaja constitution, those suffering from diseases due to vitiation of Kapha and those suffering from artificial poisoning are not indicated to sleep during the day time.

Day sleep produces complications such as anorexia, indigestion and suppression of the power of digestion, stiffness, anaemia, itching, burning sensation, vomiting and malaise, impairment of cardiac functions, stiffness, drowsiness and continuous sleep, appearance of nodules, weakness, reddish colouration of urine and eyes, coating over palate.

Chapter 2

Communicable Diseases

Patient with Tuberculosis receiving ATT for adjuvant treatment to manage minor symptoms like loss of appetite, general weakness, cough

ω General immunity enhancement measures to prevent any communicable disease

ω Prevention through immunity building measures during outbreak of communicable diseases

ω Seasonal flu as standalone or add on Ayurveda management

ω All cases of hepatitis for standalone or add on intervention ω Recurrent urinary tract infection ω Adjuvant treatment for any communicable disease like Malaria, Dengue etc.

ω Recurrent respiratory tract infections

ω Sequel of infection such as chronic cough, chronic dysentery, arthritis, debility, digestive diseases.

Chapter 3

ENT, Ophthalmology & Oral Health

Chronic and recurrent rhinitis, sinusitis, pharyngitis, tonsillitis, and laryngitis (prevention & management)

ω Dry eye syndrome

ω Computer vision syndrome

ω Non-specific burning of eyes

ω Preventive oral health and treatment of Pyorrhea and periodontitis

ω Recurrent oral aphthous ulcer

Chapter 4

Gastro-intestinal System

Irritable Bowel Syndrome (IBS) for Ayurveda management to restore psychosomatic balance

ω Inflammatory Bowel Disease (IBD) as an adjuvant or standalone treatment if it is not associated with complication like obstruction, stricture, fistulae, malignancy etc.

ω Coeliac Disease (CD) as an adjuvant or standalone treatment.

ω Gastro-Esophageal Reflux Disease (GERD) with features like heartburn, epigastric discomfort, sour belching etc.

ω Chronic gastritis with features like abdominal heaviness or fullness, indigestion etc.

ω Recurrent Gastritis with features like burning pain, heartburn, indigestion etc. ω Peptic ulcer for add on treatment along with allopathic treatment

ω Anorectal disorders such as of Internal Hemorrhoids with or without bleeding of Hemorrhoid with complications like profuse haemorrhage, strangulation, thrombosis, ulceration, gangrene, suppuration or abscess formation, fibrosis, perianal haematoma. o Acute or chronic fissure-in-ano o Anorectal abscess o Fistula-in-Ano o High level anal fistula o Recurrent anal fistula o Solitary Rectal Ulcer Syndrome (SRUS) o Anal erosions

Chapter 5

Geriatric care

ω Fragility

ω Musculoskeletal disorders

ω GIT disorders like loss of appetite, indigestion, constipation, IBS, fissure-in-ano, etc.

ω Palliative care of non-ambulatory patients

ω Mental health issues (Yoga, meditation, medicines, spiritual counseling, Panchakarma procedures like Nasya, Abhyanga etc. can be considered for treatment)

ω Insomnia

ω Immunity boosting to prevent frequent infections

ω Quality of life improvement

ω Dietary advocacy for prevention and management of malnutrition

ω Benign prostate hyperplasia

ω Care of elderly women specifically for urogenital problems

ω Referral for osteoarthritis, respiratory, gastrointestinal, reproductive, skin, ano-rectal, urological, metabolic diseases etc.

Chapter 6

Mental Health

ωPrimary Insomnia- Mild to Moderate.

ω Depression: Mild – moderate.

ω Anxiety disorder: Mild to moderate

ω Schizophrenia - positive and negative symptoms as add on therapy

ω Mild Cognitive impairment ω Alcohol use disorder – uncomplicated withdrawal syndrome

ω Bipolar Disorder with mild depression or hypomania

ω Patient preference for Ayurveda/ AYUSH treatment

ω Patients who cannot tolerate allopathic medication

ω Dietary and lifestyle advice for patients with any psychiatric disorder, particularly those with metabolic adverse effects of psychotropic medication

ω Ayurveda management will usually be adjunct to modern medicine (sole therapy in selected cases) as a collaborative effort between the Psychiatrist and the Ayurveda physician.

Chapter 7

Musculoskeletal Diseases

ωOsteoporosis/osteopenia/Osteomalacia

ω Degenerative spine disorders like Spondylosis, Spondylolisthesis etc.

ω Ankylosing Spondylitis- progressive stiffening and fusioning of joints, particularly starting from spine and hip joints

ω Degenerative Disk Disease (DDD)/Prolapsed Intervertebral Disc Disease (PIVD)

ω Sciatica- pain starts from back and radiates upto one or both legs

ω Transverse Myelitis (chronic case)- chronic & established case where phase of spinal shock is over and requires long term care

ω Osteomyelitis (chronic case)- chronic pus dischargingsinus along the line of bone

ω Osteoarthritis- Patient with bilateral knee joint pain who is either not eligible or does not require joint replacement surgery

ω Rheumatoid Arthritis- chronic case with fever, weight loss, loss of appetite, arthralgia, joint stiffness ω Psoriatic Arthritis

ω Frozen Shoulder/Adhesive Capsulitis of Shoulder Joint- restricted range of motion of shoulder joint especially in diabetic patients ω Tennis Elbow- pain at the elbow joint (Lateral epicondyle)

ω Golfer's Elbow- pain at the elbow joint (Medial epicondyle)

ω Student's Elbow- pain at the elbow joint (Olecranon process)

ω Dequervain's Disease- pain during abduction of thumb, Finkelstein test positive(pain at radial side of wrist while performing during ulnar deviation with closed fist)

ω Carpal Tunnel Syndrome- numbness, tingling sensation, weakening of grip in thumb, index finder and middle finger due to compression of median nerve in carpal tunnel at wrist joint

ω Cubital Tunnel Syndrome-numbness, tingling sensation, weakening of grip in ring finger and little finger due to compression of ulnar nerve in cubital tunnel at elbow joint

ω Housemaid's knee- pain at front part of knee joint due to inflammation of prepatellar bursa ω Achilles Tendonitis- persistent pain at the heel and the calf region

ω Plantar fascitis- pain at the sole of the foot particularly at morning after getting up from bed ω Calcaneal spur- pain at heel region

ω Tenosynovitis- pain at the lining of tendon due to inflammation of tendon sheath.

ω Tenidnitis/tendinosis- degenerative/inflammatory pain at tendon ω Bursitis- inflammation of bursa ω Ganglion- cystic swelling mostly at the dorsum of the hand ω Chronic pain management- any type of chronic pain

ω Post-surgical rehabilitation in cases of major corrective surgeries for congenital deformities, Fracture of hip and femur, tibial fracture, spina bifida, etc.

Chapter 8

Neurological Conditions

Neurological Conditions

ω Case of stroke/quadriplegia /paraplegia/hemiplegia/facial palsy after emergency treatment & early care

ω Chronic case of nerve injury- chronic loss of function of an area supplied by a particular nerve

ω Epilepsy for add on Yoga & Ayurveda

ω Headache & migraine

ω Trigeminal neuralgia

ω Senile dementia

ω Cognitive disorder

ω Cerebral palsy

ω Neurogenic bladder

ω Bowel incontinence ω Bladder incontinence

Chapter 9

Non-Communicable Diseases

Non-Communicable Diseases

ω Initial cases of hypertension not associated with any complications

ω In case of uncontrolled hypertension, for add on AYUSH management

ω Preventive diabetes in case of pre-diabetic condition /risk of developing diabetes

ω In case of uncontrolled diabetes and related complications for add on AYUSH intervention and lifestyle advocacy such as on healing ulcer, neuropathy

ω Any case of cancer to add on AYUSH intervention and lifestyle advocacy for improvement in quality of life (loss of appetite, cough, constipation, lack of sleep, chronic pain)

ω Preventive cardiology as for coronary artery disease, hypercholesterolemia

ω Coronary artery disease in the initial case of atherosclerosis to improve the elasticity of arteries and prevent them from hardening to reduce the risk of heart disease

ω In the condition of hypercholesterolemia to reduce the LDL level

ω As a supportive treatment in all cardiac conditions to improve the quality of life

ω Yoga & lifestyle advocacy and treatment for improved quality of life (loss of appetite, cough, constipation, lack of sleep, chronic pain), immunity-boosting in cancer

ω In case of peripheral vascular diseases like varicose vein for symptomatic relief and preventing complication like skin lesions, ulceration

ω Neurological conditions and after emergency treatment complications (eg. after stroke, paralysis, facial palsy)

ω For management of common kidney-related disorders, in those who refuse allopathic treatment

ω For management of post-traumatic complications or conditions (eg. frozen shoulder) ω Joint disorders such as rheumatoid arthritis, osteoarthritis, gout ankylosing spondylitis, cervical spondylosis, lower back pain, sciatica, and any other joint pain

ω Anorectal conditions like fistula, hemorrhoids, fissure in Anoand conditions that persistdespite repeated surgical procedures

Chapter 10

Reproductive & Child Health

Antenatal Care (ANC)

ω For yoga and lifestyle advice ω If the woman develops side effect to iron and folic acid tables or if the woman has persistent anemia inspite of medication

ω Mild to moderate nausea and vomiting (morning sickness)

ω Management of loss of appetite, heartburn, indigestion and constipation

ω Any other minor ailment such as non-specific body pain, backache, weakness, cold, cough, chronic urinary tract infection not responding to conventional care

Postnatal Care

ω For yoga and lifestyle advice ω Insufficient lactation /lactation failure

ω Episiotomy wound management

ω Urinary bladder atony

Infants Care

Measures for immunity booster

ω If the physician feels the need for referral for any specific reason, same may be done after mutual discussion

Infantile &Childhood Disorders

ω Diarrhea and Vomiting

ω Recurrent diarrhoea

ω Management of recovery period after diarrhoea ω Low appetite, indigestion

Cold and cough

ω To boost immunity in case of recurrent respiratory tract infection

ω Chronic bronchitis

ω Intestinal worm infestations

ω Allergic conditions

ω Supportive therapy in chronic bronchial asthma

ω Immune modulation therapies in Auto-immune disorders, Skin diseases like Eczema etc.

Reproductive Health

Dysmenorrhea

Mild to moderate dysmenorrhea ω It is preferable to have Ayurveda interventions before starting hormones

ω All women who do not want to use hormones

ω All cases of dysmenorrhea who are contraindicated for hormone therapy

Menorrhagia

It is preferable to have Ayurveda interventions for mild to moderate cases without serious underlying causes

ω All women who do not want to use hormones or other allopathic interventions ω If contraindicated for hormone therapy

ω For Yoga and Ayurveda lifestyle advice · Non-responding cases of hormone therapies

Leucorrhoea

Nonspecific leucorrhoea

ω Leucorrhoea associated with backache

ω Recurrent cases of leucorrhoea

Chapter 11

Respiratory System

Respiratory System

Common cold, allergic, chronic bronchitis, mild to moderate cases of asthma, influenza, sinusitis, tonsillitis, pharyngitis, and are not associated with any complications or serious underlying cause

ω Disease reoccurrence even after completing course of Allopathy medication

ω Post-pneumonia, exacerbations of COPD or asthma, for increasing lung capacity through yoga and breathing exercise.

ω Diet lifestyle advocacy of Rasayana for prevention and progression of respiratory disease

ω Yoga–breathing exercises will help to improve quality of life, managing stress and anxietyinpost Covid, pneumonia, COPD, asthma and bronchitis.

ω Common cases of respiratory disorders like, acute bronchitis, mild to moderate cases of asthma, sinusitis, tonsillitis (not requiring surgery), pharyngitis, and not associated with any complications or serious underlying cause

Chapter 12

Skin Disoders

Skin Disorders

Patient suffering from chronic skin diseases- melasma, fungal infection, contact dermatitis, atopic dermatitis, psoriasis, urticaria, eczema, vitiligo to add on with Ayurveda

ω Acne

ω Any chronic condition of skin where patient is not responding to Allopathy treatment and may be referred for panchakarma, kshara karma, leech therapy and other bloodletting therapies

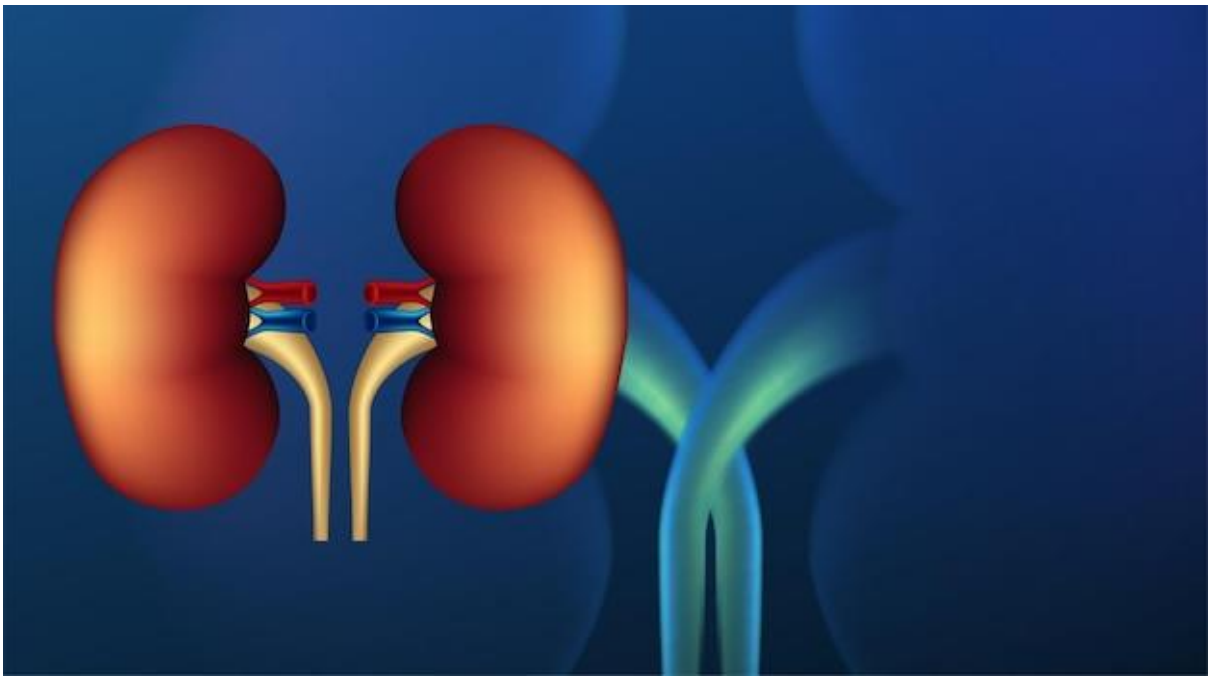
ω As a supportive therapy in malignant skin diseases for controlling the problems associated with cancer treatment (chemotherapy, radiotherapy)

ω Morbid cases of filariasis wherever treatment is available

.

Chapter 13

Urinary System



Urinary System

Benign Prostatic Hyperplasia (BPH)

ω Recurrent urinary tract infection ω Non-specific burning urination

ω Urolithiasis with stone size less than 10 mm without complications

ω Chronic kidney disease (CKD) or medical renal disease (MRD) like hypertensive nephropathy, diabetic nephropathy with or without dialysis treatment for add on treatment.

Reference

NMC

NCISM

CCRAS

AVP Research Foundation

Marilena Gilca and Dorin Dragos Extraoral Taste Receptor Discovery: New Light on Ayurvedic Pharmacology

Ayush Module – Internship Electives for MBBS

FOR AYURVEDA SYSTEM OF MEDICINE

- **An Intern has to undergo for Training in Ayurveda Institutions as per below mentioned schedule :-**

Day	Activity
1st Day	Guided tour of the Institution
	Orientation/introduction to Ayurveda (Fundamental Principles – Dosha, Dhatu, Agni, Kostha, Prakruti, Saara etc.) followed by Interaction
	Introduction to Rasapanchaka. Principles of Bhaishajyakalpana & Knowledge of dosage forms. Introduction to Bhasma & Bhasma Praiksha Exposure to Rashashala
2nd Day	**Dept. of Kayachikitsa :-** Introduction to Samprapti (Pathophysiology) & Prinicples of Samprapti Vighatana (Management) IPD rounds & attending OPD Discussion on clinical success stories
3rd Day	**Dept. of Panchkarma :-** Introduction of Panchkarma (concept of sodhana, pradhana karma, upakarma, ritu soadhana etc.) IPD rounds & attending OPD Exposure to Panchakarma Procedures
4th Day	**Dept. of Prasuti, Stri rog :-** Introduction to Prasuti, Stri rog and Kaumarbhritya IPD rounds & attending OPD Knowledge of Uttar basti and other procedures Discussion on clinical success stories
	Dept. of Kaumarbhritya :- Introduction to Prasuti, Stri rog and Kaumarbhritya IPD rounds & attending OPD Discussion on clinical success stories
5th Day	**Dept. of Shalakya :-** Introduction to Shalakya Tantra IPD rounds & attending OPD Exposure to various Kriyakalpa procedures Discussion on clinical success stories
6th Day	**Dept. of Shalya Tantra :-** Introduction to Shalya Tantra IPD rounds & attending OPD Exposure to various Shastra & Anushastra procedures Discussion on clinical success stories

AYUSH MODULE – ELECTIVES FOR MBBS INTERNS

FOR UNANI SYSTEM OF MEDICINE

An Intern has to Undergo of Training in Unani Institutions as per the below mention schedule.

S.No	Department/ Speciality	Nature of Activity
		Day-1
1	Know Your Campus:- Introduction Programme and Visit	• Introductory Programme • Historical background, Origin and basic principles of Unani Medicinal system • Orientation about the Humoural Theory (Dam, Balgham, Safra and Sauda), Temperamental Theory, 06 essential factors for life. • Activities and achievements of units and facilities. • Orientation on Urdu and Arabic Language. • **A guided tour of the entire campus, infrastructure and facilities.**
		Day- 2
2	Teaching Pharmacy Tour	• To orient the student about the basic knowledge, principles of formulation & prescription of Unani medicines, Dosage forms. • Introduction to Raw Drugs/ Medicinal Plants, Metals, Minerals and Animal derivatives used in various Unani Medicines and its purification process. • Visit to Herbal Garden and Mufradat Museums/lab (single drugs) • Visit to Murakkkabat wa Saidla Meuseum/lab • Exposure to various Alat (instruments and machinery) use for the preparation of drugs. • Visit to Hospital Dispensary
		Day- 3
3	Department of Moalajat/ Amraze Jild wa Tazeeniyat	• Introduction to Asbab (causes), Alamat (signs and symptoms), Mahiyatul Amraz (pathology), Usoole Ilaj (principle of management) • Introduction of Unani Diagnostic tools like Nabz, Baul o Baraz. • Ghizai Hidayat wa Parhez (Diet therapy and restrictions). • Attending OPD and IPD rounds (Moalajat) • Discussion on the clinical success stories / cases (Moalajat)
		• Introduction to Asbab (causes), Alamat (signs and symptoms), Mahiyatul Amraz (pathology), Usoole Ilaj (principle of management). • Introduction of Unani Diagnostic tools like Nabz, Baul o Baraz. • Ghizai Hidayat wa Parhez (Diet therapy and restrictions). • Attending OPD and IPD rounds (Amraze Jild wa Tazeeniyat) • Discussion on the clinical success stories / cases (Amraze Jild wa Tazeeniyat)
		Day- 4
4	Department of Ilaj Bit Tadabeer	• Introduction on different Tadabeer used in Unani system of medicine. • Orientation about the different traditionally used procedures; a) Fasad (Venesection) b) Hijama (Cupping) c) Qai (Emesis) d) Irsal e Alaq (Leech Therapy) e) Dalaq (Massage) f) Riyazat (Exercise and Yoga) g) Hammam (Turkish Bath) h) Huqna (Enema) i) Tareeq (Sweating) • OPD procedural exposure and IPD rounds • Discussion on the clinical success stories / cases

Day- 5		
5	Department of Jarahat and Ain, Uzn, Anaf Halaq wa Asnan	• Introduction to Jarahat. • Attending OPD and IPD rounds • Exposure to various Alat (instruments) • Discussion on the clinical success stories / cases
		• Introduction to Ain, Uzn, Anaf Halaq wa Asnan. • Attending OPD and IPD rounds • Exposure to various Alat (instruments) • Discussion on the clinical success stories / cases
Day-6		
6	Department of Ilmul Qabalat wa Amraze Niswan	• Introduction to Ilmul Qabalat wa Amraze Niswan. • Attending OPD and IPD rounds • Exposure to various Treatment Methods (like Farjzah, Nutool wa Humool) • Discussion on the clinical success stories / cases
*Pre-Test, Post-Test & Feedback: ➢ Pre-Test & Post-Test shall be from the KAP questionnaire For Unani system of medicine (First day and Last day of the internship) **E-logbook shall be verified and certified by the Head of the Department and the unit under he/she works.		

AYUSH MODULE – ELECTIVES FOR MBBS INTERNS

FOR SIDDHA SYSTEM OF MEDICINE

An Intern has to Undergo for Training in Siddha Institutions as per the below mention schedule.

S.No	Department/ Speciality	Nature of Activity
		Day-1
1	Know Your Campus:- Introduction Programme and Visit	• Introductory Programme • Historical background, Origin, introduction of Siddhars and basic principles of Siddha System of Medicine. • Orientation about the Three Humoural theory (Vali, Azhal and Aiyyam), Five Elemental Theory, Seven Udalkattugal, Envagai Thervu, Ninety Six Thathwas, Temperamental Theory etc. • Tamil Language and Siddha ancient literature. • A guided tour of the entire campus, infrastructure and facilities.
	Teaching Pharmacy Tour	• Introduction to Raw Drugs/ Medicinal Plants, Metals, Minerals and Animal derivatives used in various Siddha Medicines and its purification process • Introduction to higher order of medicines such as Parpam, Chenduram, Chunnam etc and their preparations. • Tools and instruments used in the Pharmacy.
		Day- 2
2	Department of Maruthuvam (Medicine)	• Introdcution to 32 types of Siddha Agamaruthuva Muraikal (Internal Medicines) • To orient the student about the basic knowledge, principles of formulation & prescription of Siddha medicines, dosage forms. • Introduction on Siddha diagnostic methods: Naadi Parisodhanai, Neerkkuri and Neikkuri and Manikadainool. • Pathyam (Regulation of diet and habits) prescribed in Siddha for patients. • Attending OPD and IPD rounds • Discussion on the clinical success stories /cases
		Day- 3
3	Department of Varmam, Puramaruthuvam and Sirappumaruthuvam	• Introduction of Varma points and pathological Varma conditions and Varmam Treatment. • Thokkanam Techniques. • Introdcution to 32 types of Siddha Puramaruthuva Muraikal (External Medicines) • Siddha Management of Neuro- Musculo- Skeletal disorders. • Siddha Management of Psychiatric cases. • Kayakarpam (Rejuvenation therapy) • Siddhar Yoga Maruthuvam (Yoga, Pranayamam and Dhyanam). • Attending OPD and IPD rounds Discussion on the clinical success stories / cases
		Day- 4
4	Department of Aruvai including Kan, Kathu, Mookku, Thondai, Pal and Thol Maruthuvam	• Introduction to Siddha Surgical instruments. • Orientation about 25 different Siddha surgical procedures; a) Attai vidal (leech therapy), b) Aruvai (excision), c) Kuruthi vaangal (blood letting), d) Salagai (probing), e) Varthi (medicated wick), f) Oothal (blowing), g) Peechu (enema / douch), h) Urinjal (sucking), i) Kattuthal (bandaging), j) Chuttigai (cauterization),

		k) Vedhu (steam therapy), l) Pugai (fumigation) and Kaaram (caustic application) etc; • Preparation of Karanool. • Introduction to Siddha interventions in the management of Ophthalmology, ENT, Dentistry and Dermatological disorders. • Discussion on the clinical success stories / cases
Day- 5		
5	Department of Sool and Magalir Maruthuvam	• Siddha Ante-natal and Post natal care. • Siddha treatments for Gynecological diseases. • Attending OPD and IPD rounds • Discussion on the clinical success stories / cases
	Department of Kuzhathai Maruthuvam	• Siddha medicines for new born (Urai Mathirai) • Siddha Immune Booster for Childran. • Management of paediatric cases with Siddha medicines • Application of Puramaruthuvam in Paediatric cases.
Day-6		
6	Dispensary tour	• Siddha medicines • Dosage • Anupanam • Culinary Medicine.
	Library tour	• Different Books of Siddhars
	• Herbal Garden Tour	

* Pre-Test, Post-Test & Feedback: ➢ Pre-Test & Post-Test shall be from the KAP questionnaire For Siddha system of medicine (First day and Last day of the internship)

**E-logbook shall be verified and certified by the Head of the Department and the unit under he/she works.

फीडबैक

शक्तियां:

सुधार की आवश्यकता वाले क्षेत्र

अभ्युक्तियां

छात्र ---------- तारीख: ----------

संकाय सदस्य ---------- तारीख: ----------

डॉ. संध्या भुल्लर, सचिव

[फा. सं. विज्ञापन-III/4/असा./448/2021-22]

NATIONAL MEDICAL COMMISSION

NOTIFICATION

New Delhi, the 18th November, 2021

No. UGMEB/NMC/Rules & Regulations/2021/ .—— In exercise of the powers conferred by section 57 read with sub-section (1) of section 24 of the National Medical Commission Act, 2019 (30 of 2019), the National Medical Commission hereby makes the following regulations namely:-

1. Short title and commencement.— (1) These regulations may be called the National Medical Commission (Compulsory Rotating Medical Internship) Regulations, 2021.

(2) They shall come into force on the date of their final publication in the Official Gazette of India.

2. Definitions.— (1) In these regulations, unless the context otherwise requires,—

(a) "Act" means the National Medical Commission Act, 2019 (30 of 2019);

(b) "Commission" means the National Medical Commission constituted under section 3 of the Act;

(c) "Curriculum" includes the elements detailed in Schedule III;

(d) "Foreign Medical Graduate" shall have the meaning assigned to it in clause (c) of regulation 2 of the National Medical Commission (Foreign Medical Graduate Licentiate) Regulations, 2021;

(e) "Intern" means a medical graduate undergoing compulsory rotating internship training under these regulations;

(f) "Log Book" means an official document chronicling the performance of an intern and a record of the work done, procedures performed and competencies achieved by him;

(g) "Mentor" shall mean an appropriately qualified and trained medical teacher and senior to the trainee, who guides the trainee in all aspects of graduation, such as, education, skill enhancement, research work and ethical values;

(h) "Notification" means a notification published in the Official Gazette and the expression "notify" shall be construed accordingly;

(i) "Permanent Registration" is the registration of eligible persons with a duly recognised primary medical qualification as regulated under the provisions of Chapter VI of the Act, that provides license to an individual to independently practice modern scientific system of medicine or allopathy in India;

(j) "Primary Medical Qualification" means a medical graduation degree, such as, Bachelor of Medicine and Bachelor of Surgery (MBBS) conferred in India or an equivalent qualification of any country other than India or an

9.	Mandatory Exclusive	Emergency/ Trauma/ Casualty	2 weeks	Includes postings related to Resuscitation areas, Triage, In-patient wards and Operation Theatre, Basic Life Support as well as exposure to medico-legal procedures
10.	Mandatory Exclusive	Forensic Medicine and Toxicology	1 week	Includes Autopsy postings
11.	Mandatory Exclusive	Dermatology, Venereology and Leprology	1 week	Predominantly Out-patient postings with exposure to handling emergencies
12.	Mandatory Exclusive	Otorhinolaryngology	2 weeks	Predominantly Out-patient postings with exposure to handling emergencies, Minor as well as Major Operation Theatres
13.	Mandatory Exclusive	Ophthalmology	2 weeks	Predominantly Out-patient postings with exposure to handling emergencies, Minor as well as Major Operation Theatres
14.*	Electives Exclusive*	Broad Specialties Group	4 weeks total; 2 weeks minimum,	• Respiratory Medicine and Directly Observed Treatment Short Course in Tuberculosis (DOTS-TB) Center • Radio diagnosis • Lab Medicine • Geriatric Medicine
15.*	Electives Exclusive	Indian Systems of Medicine	1 week	***May** choose any:* • Ayurveda • Yoga • Unani • Siddha • Homeopathy • Sowa Rigpa

***Note 1: Electives may be selected by candidates as per their choice:**

- **Distribution for electives:**

- Major broad specialty: One minimum for 1 week

- Remaining 3 weeks- Any broad specialty or 2 weeks for broad specialty and 1 week for AYUSH

- Indian systems of Medicine: Optional any one for 1 week. If the college does not have facilities for Electives in AYUSH, an Memorandum of Understanding (MOU) with any Government institution in the same town/ city / district may be established by the college; training must be certified by the mentor with the concurrence of college/ institution where the candidate is enrolled for MBBS.

Note 2: Exposure of interns is mandatory in the following relevant areas during posting for training in clinical departments, namely:—

(i) Laboratory Medicine and Clinical Biochemistry;

(ii) Histopathology and Cytopathology;

(iii) Hematology, and Transfusion Medicine / Blood Bank;

(iv) Microbiology (including Virology);

(v) Hospital Infection Control, Biomedical Waste Management, Central Sterile Supply Units;

(vi) Medical Record Keeping;

(vii) Hospital Information Services.